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FOREST INSECT CONDITIONS IN CALIFORNIA

1954

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The California Forest Pest Control Action Council is
composed of representatives of the following organizations:

California Forest Protective Association

State of California Bureau of Entomology

State of California Division of Beaches and Parks

State of California Division of Forestry

U. S. Bureau of Indian Affairs

U. S. Forest Service

U. S. National Park Service

University of California

Western Pine Association

FOREST INSECT CONDITIONS IN CALIFORNIA

As Revealed by Surveys During 1954

Official Report of the

CALIFORNIA FOREST PEST CONTROL ACTION COUNCIL

Sacramento

January 1955

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SUMMARY OF CONDITIONS

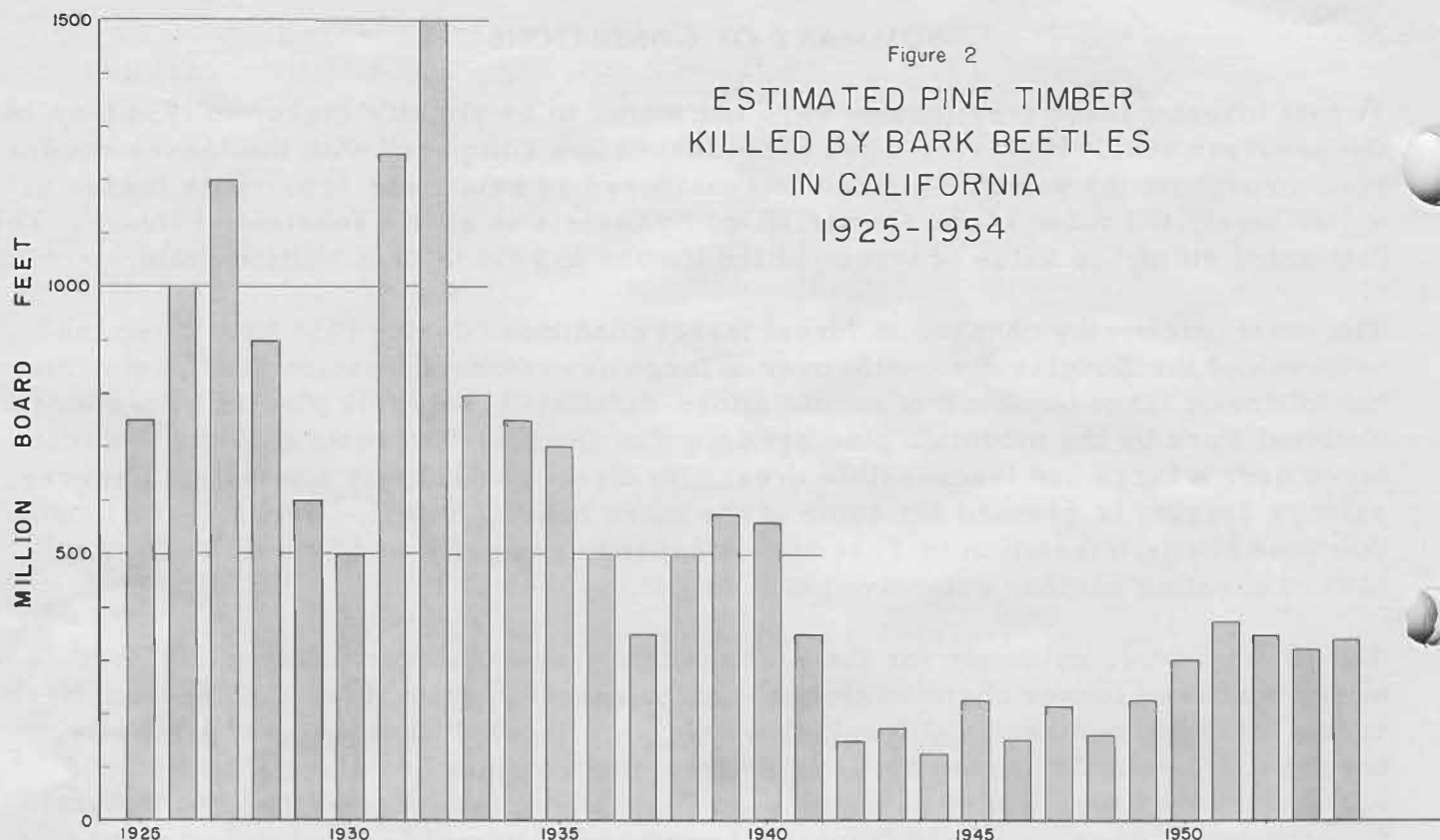
Forest insect-caused tree losses were estimated to be slightly higher in 1954 than in the previous year. However, when these losses are compared with the losses occurring throughout the years, they can be considered as relatively low. With losses at a low level, the value of the timber killed by insects is still a substantial figure. The estimated stumpage value of insect-killed timber in 1954 is 18.3 million dollars.

The most noteworthy changes in forest insect conditions during 1954 have been the outbreak of the Douglas-fir beetle over a large area in northwestern California, and the killing of large numbers of needle miner-defoliated lodgepole pine in Yosemite National Park by the mountain pine beetle. The Douglas-fir beetle epidemic is scattered over a large and inaccessible area. No direct control was attempted; however, salvage logging is planned for some of the more heavily infested areas. The mountain pine beetle infestation in Yosemite is expanding rapidly and is well on its way toward creating another extensive ghost forest.

The fir engraver, epidemic for the past several years, has declined rapidly, but heavy scattered losses continue throughout the range of white fir in California. Bark beetle losses in southern California have shown a decided improvement generally, but the California flatheaded borer in Jeffrey pine continues to exact a heavy toll, particularly in areas where no control has been attempted. Sugar pine and Douglas-fir cone crops were examined throughout northern California and were found to be suffering a high percentage of damage due to cone and seed insects. Mountain pine beetle-caused losses in sugar pine remained at an endemic level throughout most of the westside Sierra. No serious damage by the western pine beetle and pine engravers throughout most of the pine belt has been noted. A few local flareups by these insects have occurred as a result of improper slash disposal in scattered stands of ponderosa pine in the Sierra foothills.



Figure 1. Ponderosa pine killed by the western pine beetle and pine engraver beetles. Osborne Hill Zone of Infestation, Nevada County.



SURVEYS OF FOREST INSECT DAMAGE

During the past year surveys of forest insect damage involving most of the major forest insects have been conducted by the Division of Forest Insect Research, California Forest and Range Experiment Station. The cooperative insect detection program, which depends upon observations of foresters in private, state and federal employ for initial reports of forest insect damage, was continued. All detection reports were screened by the Station and, where necessary, follow-up investigations were made by entomologists to determine if control was needed. Forty detection reports were channeled through the Station this year. Of this total, twenty were accompanied by small containers of samples of the insects and the damage. These containers were an innovation introduced by the Station this past year to facilitate proper identification of insect pests.

The number of detection reports received in 1954 is very low for a state as large as California, where there are so many diverse forest insect problems. The reason for this may be the generally low level of insect activity this past year; however, a more basic reason may be the inability of persons engaged in forestry in the field to recognize insect damage, or a feeling that insect problems that are noticed are too insignificant to warrant reporting. As an aid in this direction, short field schools are now being planned.

Although cooperators have under surveillance a large part of the timbered area of the State, there remains a vast expanse of inaccessible and relatively remote land from which no information is available. To cover these areas adequately and to

gain an overall picture of forest insect conditions, a statewide aerial survey is conducted annually by the California Forest and Range Experiment Station, assisted by private, state and federal forestry agencies. This year the aerial survey was flown in September and October, and covered approximately 15 million acres. The plane and pilot for the survey were made available by the Agricultural Research Service, Beltsville, Maryland. Participating were 21 U. S. Forest Service personnel, 10 private foresters, 4 California Division of Forestry forest technicians, and 3 National Park Service rangers. The survey uncovered new areas of Douglas-fir beetle loss on the north coast and several local infestations of pine engravers and western pine beetles in the Sierra foothills. The overall picture, as determined by a comparison with previous aerial surveys, was a generally low level of insect activity outside of the Douglas-fir beetle infestation area of the northwestern part of the State.

Where detailed quantitative information is desired, an appraisal survey is necessary. In 1954, the Station conducted nine such appraisal surveys. Four of these were made in areas where control projects had been carried on earlier, namely: the mountain pine beetle infestation in Yosemite National Park; the Jeffrey pine beetle infestation on Lassen National Forest and Lassen Volcanic National Park; the mountain pine beetle infestation in second-growth sugar pine at Miami Creek on the Sierra National Forest; and the appraisal survey made following the experimental spraying of the lodgepole needle miner in Yosemite National Park. The other five appraisal surveys were in areas where information was needed to formulate plans for coping with infestations which had not received any control to that time. These were: the Douglas-fir beetle infestation in the northwest part of the State; the Jeffrey pine beetle and California flatheaded borer infestation in the Deadman area of the Inyo National Forest; the California flatheaded borer infestation at Mt. Laguna on the Cleveland National Forest; the mountain pine beetle infestation in second-growth ponderosa pine at Crystal Bay, Lake Tahoe; and the mountain pine beetle infestation at Joseph Creek on the Modoc National Forest. Seven of these appraisal surveys were made using ground methods for sampling tree losses within the infestation areas. The lodgepole needle miner infestation was appraised by sampling the needle miner population. The other appraisal survey, involving the Douglas-fir beetle infestation, was made from the air. This was a cooperative survey involving the State Division of Forestry, the Regional Forest Service, and the Station. In this work beetle-killed trees were counted from a helicopter and mapped in place. Volume figures from prior ground reconnaissance were applied to the results to arrive at an estimate of the loss.

To arrive at accurate figures for the amount of insect-caused loss over the entire State for a year, or period of years, it is necessary to conduct some type of drain survey. Here in California a plan has been proposed, and the principle generally accepted, whereby a series of permanent sample plots, scattered over the State, will be examined each year, and the information thus obtained will be used in determining the total loss for the State. A canvass of the land managing agencies throughout the State revealed that more than 4,000 plots of various types are already in existence. Many of these plots will be examined to determine their usefulness in the drain survey. Since the existing plots would not give complete coverage of the State, it has been necessary to establish new plots within certain areas. At present, there are 75 of these new plots, half of which have been established by private industry. This drain survey is another example of the benefits of cooperative efforts.

STATUS OF THE MAJOR FOREST INSECT PESTS DURING 1954

DOUGLAS-FIR BEETLE, Dendroctonus pseudotsuga (Hopk.)

Heavy Douglas-fir losses due to this insect are occurring throughout the Klamath River and Trinity River drainages in northwestern California and now cover an estimated 200,000 acres. Ground and aerial surveys during late June and July indicate the volume of timber killed, including 1954 loss, to be about 100 million board feet. The Douglas-fir beetle infestation has increased considerably over last year, and at present possesses a potential capable of causing further severe losses should conditions continue to favor high beetle populations. Steps are currently being taken to shift logging operations into areas of heavy loss to salvage as much beetle-killed timber as possible.

MOUNTAIN PINE BEETLE, Dendroctonus monticolae Hopk.

Losses caused by this insect in severely needle miner-defoliated lodgepole pine are increasing rapidly in the high country of Yosemite National Park despite efforts during the past year to control the outbreak. An appraisal survey in September indicated that there were 3,945 infested trees on 750 acres. Elsewhere, the mountain pine beetle continues to cause losses in the ponderosa pine stands of Crystal Bay, Lake Tahoe, Nevada and in a recreational stand of lodgepole pine at Reds Meadow on the Inyo National Forest. Maintenance control is being carried on in the latter area.

LODGEPOLE NEEDLE MINER, Recurvaria milleri Busck.

This insect infestation of some 46,000 acres within Yosemite National Park continues at a high level with no definite downward trend in populations apparent. Research on the biology and control of the needle miner were continued this past season. Preliminary tests with several insecticides show promise and will be continued next year.

CALIFORNIA FLATHEADED BORER, Melanophila californica Van D.

Heavy losses in southern California Jeffrey pine stands continue to occur as a result of the depredations of this insect. Penetrating oil sprays are being used on four projects to determine their ultimate effectiveness in reducing losses. Sanitation-salvage logging of a few areas is planned for next year.

JEFFREY PINE BEETLE, Dendroctonus jeffreyi Hopk.

The sudden infestation of last year along the north boundary of Lassen Volcanic National Park and the adjoining Lassen National Forest has been substantially reduced through salvage logging of infested trees combined with direct control measures. Similar losses are occurring on the Inyo National Forest, and sanitation-salvage logging of this area is planned.

FIR ENGRAVER, Scolytus ventralis Lec.

Information gathered from mortality plots throughout the Sierra region reveals heavy scattered fir engraver losses in white fir. Although the present white fir loss is down in contrast to the high losses of the past few years, it is nonetheless a serious problem. There are no known control measures that are effective against this insect.

WESTERN PINE BEETLE, Dendroctonus brevicomis Lec.

Losses caused by this insect remain relatively low in direct contrast to its past destructive pattern of many years standing. The major loss this past season has been in the scattered Sierra foothill timber where some control has been necessary. Light scattered loss continues to occur throughout the northern Sierra.

PINE ENGRAVERS, Ips spp.

The killing of small trees and the tops of larger trees has been noted in several areas this year. This type of loss has, in most cases, been the direct result of improper slash disposal, mostly in areas adjacent to small short-term logging operations. Much of the western pine beetle loss in the Sierra foothills has been a followup on this type of damage.

OTHER IMPORTANT INSECTS

The sugar-pine cone beetle, Conophthorus lambertianae Hopk., destroyed sugar pine cones and seeds over most of the State, with losses being particularly heavy in the north coast and north Sierra subregions. Douglas-fir seeds and cones suffered heavy losses from the Douglas-fir seed chalcid, Megastigmus spermatrophus Wachtl.; the fir cone moths, Barbara spp., and several other species of lesser importance. The Douglas-fir cone and seed losses averaged 82 percent, and ran as high as 98 percent on some of the sampled areas. This is the first year that Douglas-fir cone and seed losses have been sampled; therefore, it is not known whether this is an unusually high figure compared with past losses. Sawflies, Neodiprion spp., continued to defoliate white and red fir throughout the Sierra; however, their populations appear to have decreased over last year in most areas and little damage has been reported. A small outbreak of Osler's tussock moth, Hemerocampa osleri (Barnes), developed in Calaveras County. Past outbreaks of this insect have been short-lived. The spruce budworm, Choristoneura fumiferana (Clem.), remains restricted to white fir and lodgepole pine in the Warner Mountains of Modoc County where light defoliation occurred again this year. The red turpentine beetle, Dendroctonus valens Lec., was found generally throughout the pine stands of the State. This beetle is usually secondary, but it is sometimes primary. In combination with several other cambium feeding insects, it caused moderate damage in southern California stands this year, particularly in Jeffrey pine. Twig beetles, Pityophthorus spp., are believed responsible for tip killing in some areas, but their damage is down over last year. The reproduction weevil, Cylindrocopturus eatoni Buch., has not been reported as causing damage this year.



Figure 3. Douglas-fir cones infested with cone moths. The caterpillars of these moths feed upon and destroy the cones and seeds.

THE CONTROL PROGRAM ENDORSED FOR 1955

On November 4, 1954, the California Forest Pest Control Action Council held its annual meeting to review the status of forest pests and forest pest activities within the State during the year. Forest insect control programs recommended and carried out during 1954 were discussed and proposed control projects for 1955 were acted upon. In all, some 35 infestation areas were considered at this meeting. The discussion led to the endorsement, by the Council, of the control program for 1955.

The Douglas-fir beetle infestation in northwestern California is the largest and most serious single outbreak in the State this year. With the infestation covering a large and inaccessible area and being of a widely scattered nature, it is not practical to attempt direct control, nor is it expected that logging of infested trees will give any large degree of control. All things considered, the best approach at this time is to cut the timber in the heavily infested areas, where feasible, so as to salvage as many of the beetle-killed trees as possible. This means the stepping up of road-building programs where losses are the heaviest and where other conditions will permit. Most of the loss is on national forest lands where long-term cutting plans have been in effect. These plans are now being revised so that heavily infested lands can be cutover in advance of the proposed cutting schedule formerly in effect. Private land holders in the affected area are also looking into the possibility of salvage logging beetle-killed timber on their holdings where sufficient volume can be obtained. Such a logging operation will, in many cases, necessitate a harvest cut to make the operation profitable.

The mountain pine beetle infestation, developing in the wake of the lodgepole needle miner, in Yosemite National Park, has increased considerably during the year. The lodgepole needle miner infestation has remained at the same relatively high population level as last year and within the same boundaries. No effective control methods have been found for this insect, although investigations to develop suitable measures are in progress. Mountain pine beetle activity has expanded considerably this year. In the more severely needle miner-defoliated areas, mountain pine beetle damage reached serious proportions. A large scale control project was carried on in an attempt to hold the beetle in check in one such area in Conness Basin, on the upper Tuolumne River watershed. This project was but partially successful, and an appraisal following the completion of the project disclosed that an epidemic condition still existed. Conness Basin is an area that is somewhat remote, but because of its proximity to high use recreational forests in the vicinity of Tuolumne Meadows it poses a great threat to some of the most heavily used high elevation lodgepole pine stands in the Park. Because of this, an intensified effort to control the mountain pine beetle has been recommended. However, in the light of other considerations, the National Park Service did not consider it advisable to take further action at this time.

Forest recreational areas and State and national parks receive intensive protection from insects because of the high value placed on individual trees. This is reflected in the large number of projects which are undertaken within these areas each year. In many recreational areas control work is carried on throughout the year on a maintenance basis to keep tree losses at the absolute minimum. Included in the

endorsed control program for 1955 are eight maintenance control projects in southern California and six in northern California. Of the southern California projects one is Cuyamaca Rancho State Park and the rest are in national forest recreational areas. The six northern California projects include three within national parks, two within national forest recreational areas, and one at a forest research center. This latter project at the Institute of Forest Genetics is conducted to provide protection for highly valuable trees being used in forest genetics studies.

Sanitation-salvage logging has been recommended for four southern California recreational areas and for one northern California recreational area. Sanitation-salvage logging of these recreational areas has been recommended because it offers the possibility of lasting indirect control with not only a saving of direct control costs but with an income to the land managing agency concerned.



Figure 4. Improper slash disposal. Slash such as this attracts bark beetles and is often the cause of local outbreaks. Lopping and scattering the limbs and utilizing greater portion of the bole of the tree will help in reducing bark beetle outbreaks.

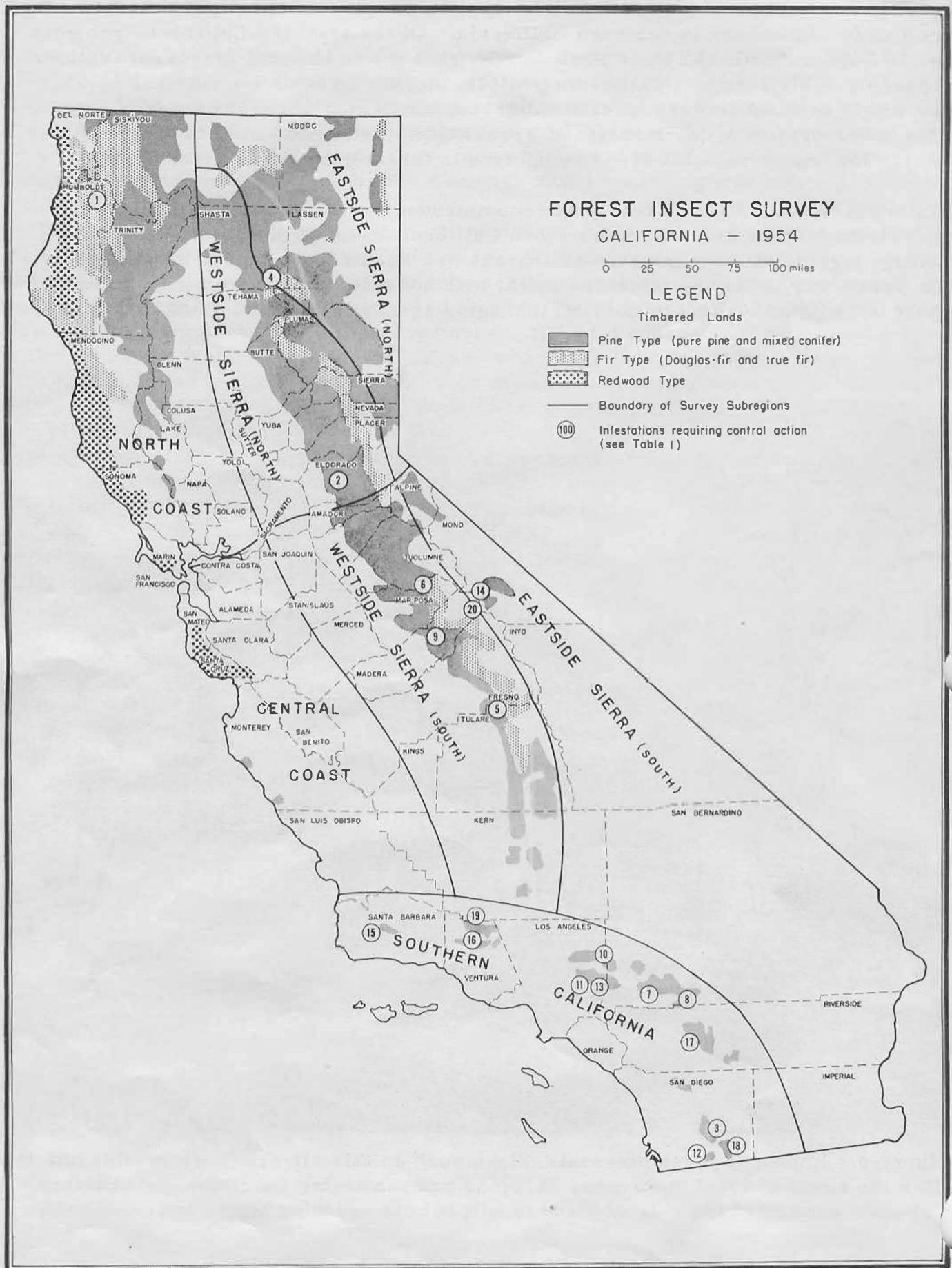


TABLE 1.--CURRENT FOREST INSECT INFESTATION AREAS REQUIRING ACTION

PROJECT AREA	LOCATION	INFESTED ACREAGE	INSECT SPECIES CAUSING LOSS	HOST TREES KILLED	RECOMMENDED ACTION
<u>COMMERCIAL TIMBERLANDS</u>					
① Klamath River and Trinity River Drainages	Del Norte, Humboldt, Siskiyou and Trinity Cos.	200,000	Douglas-fir beetle	Douglas-fir	Salvage merchantable infested trees where feasible
<u>EXPERIMENTAL AREAS</u>					
② Institute of Forest Genetics	El Dorado Co.	500	Western pine beetle Pine engraver	Ponderosa pine	Maintenance control, fell-peel-burn, or spray with toxic oil
<u>STATE AND NATIONAL PARKS</u>					
③ Cuyamaca Rancho State Park	San Diego Co.	8,000	California flatheaded borer	Jeffrey pine	Maintenance control, spray with toxic oil
④ Lassen Volcanic National Park	Shasta, Lassen Cos.	8,000	Jeffrey pine beetle Western pine beetle Mountain pine beetle	Jeffrey pine Ponderosa pine	Maintenance control, spray with toxic oil
⑤ Sequoia-Kings Canyon National Parks	Fresno and Tulare Cos.	8,500	Western pine beetle Mountain pine beetle	Ponderosa pine Sugar pine	Maintenance control, fell-peel-burn, or spray with toxic oil
⑥ Yosemite National Park	Mariposa, Tuolumne Cos.	10,000	Western pine beetle Mountain pine beetle	Ponderosa pine Sugar pine	Maintenance control, spray with oil or fell-peel-burn
		2,000	Mountain pine beetle	Lodgepole pine	Fell-burn
<u>FOREST RECREATION AREAS</u>					
⑦ Arrowhead-Crestline	San Bernardino Co.	38,000	Mountain pine beetle Western pine beetle Pine engraver Jeffrey pine beetle	Ponderosa pine Coulter pine Jeffrey pine	Maintenance control, fell-peel-burn or toxic spray, salvage
⑧ Barton Flat	San Bernardino Co.	7,500	Western pine beetle Jeffrey pine beetle	Ponderosa pine Jeffrey pine	Sanitation salvage
⑧ Bass Lake	Madera Co.	600	Western pine beetle Pine engravers	Ponderosa pine	Maintenance control, fell-peel-burn or toxic spray
⑩ Big Pines	Los Angeles Co.	2,500	California flatheaded borer	Jeffrey pine	Sanitation salvage
⑪ Charlton Flats	Los Angeles Co.	3,000	Western pine beetle Pine engravers Calif. flathead borer	Ponderosa pine Coulter pine Jeffrey pine	Maintenance control, fell-peel-burn or toxic spray, salvage
⑫ Corte Madera	San Diego Co.	1,600	Western pine beetle Pine engravers Calif. flathead borer	Coulter pine Jeffrey pine Ponderosa pine	Maintenance control, fell-peel-burn or toxic spray
⑬ Crystal Lake	Los Angeles Co.	1,100	Western pine beetle Mountain pine beetle Jeffrey pine beetle	Ponderosa pine Sugar pine Jeffrey pine	Maintenance control, fell-peel-burn or toxic spray
⑭ Deadman Summit	Inyo N. P.		Jeffrey pine beetle Calif. flathead borer	Jeffrey pine	Sanitation-salvage
⑮ Figueroa Mountain	Santa Barbara Co.	1,500	Western pine beetle	Ponderosa pine Coulter pine	Maintenance control, fell-peel-burn or toxic spray
⑯ Grade Valley	Kern Co.	5,000	Calif. flathead borer	Jeffrey pine	Sanitation-salvage
⑰ Idyllwild-San Jacinto	Riverside Co.	14,500	Calif. flathead borer Western pine beetle Pine engravers Mountain pine beetle	Sugar pine Ponderosa pine Coulter pine Jeffrey pine	Maintenance control, fell-peel-burn or toxic spray, salvage
⑱ Laguna Mountain	San Diego Co.	1,500	Western pine beetle	Coulter pine	Maintenance control, fell-peel-burn or toxic spray, salvage
⑲ Mount Pinos	Kern Co.	2,500	Calif. flathead borer	Jeffrey pine	Sanitation-salvage
⑳ Reds Meadow	Inyo N. P.	700	Mountain pine beetle	Lodgepole pine	Maintenance control, spray with toxic oil

ACCOMPLISHMENTS OF RECENT CONTROL ACTION

The following tables summarize the forest insect control and salvage activities of the major private, State and federal forestry agencies in California for 1954.

TABLE 2.--VOLUME OF INSECT-KILLED OR SUSCEPTIBLE TREES LOGGED ON NATIONAL FOREST LANDS DURING 1954

Forest	Infested Volume M	Abandoned Volume M	Semi-sal Volume M	Tree species	No. of salvage
Angeles	75	70		PP, JP, SP	4
Eldorado		1,000			3
Inyo			11,000	JP	4
Klamath	25	4,975	975	DF, PP	7
Lassen	3,000	626	42,626	PP, JP, SP	10
Los Padres	220			JP	3
Modoc		852	47,866	PP, JP	20
Plumas		1,901	9,000	DF, PP, JP, SP	30
San Bernardino	50	75	5,000	PP, JP, SP	6
Tahoe		807		DF, PP, SP	11
	3,370	10,306	116,467		98

TABLE 3.--VOLUME OF INSECT-KILLED OR SUSCEPTIBLE TREES REMOVED BY PRIVATE LOGGING COMPANIES DURING 1954

Company	Volume (M.B.M.)	Tree species	Control method
Big Bear Timber Company	6,000	JP, PP, WF	Salvage, sanitation-salvage
California Foresteering	620	PP, SP, WF	Salvage
Collins Pine Company	1,000	PP	Salvage
Diamond Match Company	46,053	PP, SP	Salvage, sanitation-salvage
Fruit Growers Supply Company	1,044	PP, JP	Salvage
Scott Lumber Company	9,402	SP, DF, WF, PP, JP	Salvage, sanitation-salvage
Setzer Forest Products	14,436	PP, WF	Salvage, sanitation-salvage
Shasta Forests Company	1,273	PP, DF, WF, IC	Salvage
Soper-Wheeler Company	10,555	PP, DF, WF, SP	Salvage, sanitation-salvage
Winton Lumber Company	350	PP, SP, WF	Salvage

90,733 (Estimate 4,745 MBM of this actually insect-infested)

TABLE 4.--INSECT CONTROL PROJECTS ACCOMPLISHED ON STATE AND PRIVATE LAND IN 1954 UNDER THE STATE FOREST INSECT CONTROL LAW IN COOPERATION WITH TIMBERLAND OWNERS

Location	No. Acres	No. Trees	Insect	Host	Cost	Control Method
*Arrowhead-Crestline, San Bernardino Co.	15,649	451	Ips, Mc, Dm, Df, DJ	PP, JP, SP, CP	\$11,408	Peel-burn, toxic spray
Guyamaca Rancho State Park, San Diego Co.	8,000	203	Mc	JP	3,168	Toxic spray
Osborne Hill, Nevada Co.	9,200	554	Db, Ips	PP	2,622	Peel-burn
*San Jacinto, Riverside Co.	5,722	190	Mc, Db, Dm	JP, PP, SP, CP	3,657	Peel-burn, toxic spray
**Stirling City, Yuba Co.	2,000	178	Db, Ips	PP	675	Toxic spray
	40,771	1,606			\$21,590	

* Work contracted to the U. S. Forest Service.

** No state or federal funds involved.

TABLE 5.--INSECT CONTROL PERFORMED BY FEDERAL AGENCIES DURING 1954

Location	No. Acres	No. Trees	Insects	Hosts	Control method	Cost
NATIONAL PARKS						
Lassen-Volcanic	5,080	224	Db, Dm, Df	PP, JP, SP	Fell-burn, toxic spray	\$ 8,172
Sequoia-Kings Canyon	31,660	117	Db, Dm, Df	PP, JP, SP	Fell-burn	6,925
Yosemite	55,500	2,116	Db, Dm, Df	PP, JP, SP, LP	Fell-burn	31,316
	92,240	2,457				\$46,413
NATIONAL FORESTS						
Angeles	4,100	47	Db, Mc, Ips	PP, JP, CP	Toxic spray	\$ 1,472
Cleveland	1,040	182	Mc, Ips, Db	CP, JP	Toxic spray	2,504
Los Padres	900	25	Db	CP, PP	Toxic spray	831
Inyo	700	25	Dm	LP	Toxic spray	500
San Bernardino	19,608	344	Ips, Mc, Db, Dm, Df	PP, JP, CP, SP	Peel-burn, toxic spray	10,831
Shasta-Trinity	70	Plantation	Grasshoppers	JP, PP	Dieldrin, aerial spray	321
Sierra	600	30	Db	PP	Peel-burn, toxic spray	277
	26,618	653				\$16,736
OTHER						
Institute of Forest Genetics	8,000	80	Db	PP	Fell-burn, toxic spray	\$ 800

Key to Abbreviations Used:

Insects	Host Trees
Db - Western pine beetle	Ips - Pine engravers
Dm - Mountain pine beetle	Mc - California flatheaded borer
Df - Jeffrey pine beetle	PP - Ponderosa pine
	SP - Sugar pine
	LP - Lodgepole pine
	JP - Jeffrey pine
	CP - Coulter pine
	WF - White fir
	DF - Douglas-fir
	IC - Incense-cedar



Figure 5. Control work in high-use recreational areas is complicated by the many developments present. Bringing trees down in sections, such as is being done here, is a common occurrence.

Additional information concerning forest
insects may be obtained by request to:

California Division of Forestry
301 State Office Building No. 1
Sacramento, California

or

California Forest and Range Experiment Station
Division of Forest Insect Research
Box 245
Berkeley 1, California